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PATENT SPECIFICATION

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(54) RELEASABLE CARPET

(71) We, ALLIED CHEMICAL CORPORATION, a Corporation organized and existing under the laws of the State of New York, United States of America, of Columbia Road, and Park Avenue, Morris Township, Morris County, New Jersey 07960, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to carpet, especially in the form of carpet tiles, and is concerned to provide carpet that can readily be affixed in position and released from position. The prior art is described in British Specification 1,376,262 issued 4th December, 1974. The prior art provides carpet material and method for installation as a tile by the consumer or by an installer in contract applications. The carpet tile is usually made in the form of rectangles of 9, 12, 18 or 24 inch squares but other shapes or configurations are also available. The tiles can easily be changed especially where they are in a wear pattern due to traffic or damage due to soiling. The prior art uses a quick-release adhesive or a washable back coating which can be washed off when the tile requires removal. Most pertinent to this invention is the disclosure in British 1,376,262 of a carpet facing having a flock layer on the underside and a secondary backing having a flock layer on the face of a foam pad; installation is accomplished by pressing the flock layers together. This system allows easy detachment by lifting the carpet to separate the flock layers. This prior art quick release carpet tile would prove insufficient to bond the carpet facing to the backing in instances where the tile is caught at the edge by a piece of furniture or a high-heeled shoe and makes vandalism and theft too easy. This weak "lock" between the carpet facing and carpet backing is a serious drawback in the prior art and would be unacceptable in commercial applications.

The quick release carpet of the present invention can be bonded in position with a strength acceptable in commercial applications

where traffic may be heavy. The carpet module of this invention will resist pull-up of the individual carpet module when sliding furniture along the carpet or by persons in high heels and requires a substantial force to remove so that vandalism and theft is much more difficult.

This invention is embodied either in complete carpet or in a carpet module. By "carpet module" is meant narrow-width fabric up to four feet wide of indeterminate length, i.e., carpet runners, intended to be laid side by side to form a continuous surface, in addition to the prior art carpet tile of rectangles, squares, or other shapes having a maximum dimension of three or four feet (usually 12, 18 or 24-inch squares).

According to the present invention there is provided carpet substantially the entire underside of which is covered by one surface of a velvet-type fastening system. Such a system is described in detail in U.S. Patents 2,717,437 and 3,009,235, and the use of a velvet-type fastening system for securing carpets is disclosed in British Specifications 1,204,886 and 1,187,103 where, however, the fastening system is in the form of tapes used only around the edges of carpets and rugs. In the carpet of our invention, one of the two surfaces of a velvet-type fastening system is secured to the entire underside—or substantially the entire underside, e.g. 70%,—of the carpet.

By a "velvet-type fastening system" we mean the system which consists of two surfaces intended to be releasably secured together, one of which surfaces (the "velvet-type fastener") is a fabric having a raised pile in the form of threads the end of at least some of which are provided with material-engaging means while the other surface, the so-called "loopy fabric", is a fabric having loops engageable by the material-engaging means of the first surface.

The material-engaging means on the first surface are preferably mushroom-shaped, while the loops on the second surface are preferably each a fibre having its ends anchored in the fabric.

The principle of the first surface of a

velvet-type fastening system is disclosed in U.S. Patent 2,717,437, and the principle of the fastening system used for the present invention in which one surface has hooking means while the other has loops for the hooks, is disclosed in U.S. Patent 3,009,235.

In one form of the invention, a velvet-type fastener permanently attached to the entire underside thereof, the fastener having projections which may be releasably attached to a loopy fabric. In an alternative form of the invention, the loopy fabric is fastened to underside of the carpet or carpet module and the velvet-type fastener may be the outermost portion. The underside need not be completely covered with the loopy fabric or velvet-type fastener, and can be only substantially covered, for example, from between 70 percent to 99 percent covered.

The carpet and carpet modules of this invention can be installed in the normal horizontal position on the floor, or in any other position such as on walls, ceilings or inclined surfaces. By use of the term "underside" is meant the side of the carpet or carpet module away from the facing fiber. Use of the term "underside" as used herein shall not be restricted to carpet or carpet modules installed in the horizontal upright (floor) position, but shall include vertical (wall), reverse horizontal (ceiling), and inclined positions. The loopy fabric has staple fibers especially needle-punched into the fabric so that most of the fibers form a loop each end of which is anchored to the face of the fabric. The projections of the fastener are releasably attached to the loops to prevent both parallel and lateral motion of the facing relative to the loopy fabric. This combination of velvet type fasteners having projections releasably attached into a loopy fabric requires substantial force to separate the facing and the primary backing from the loopy fabric or secondary backing. This force is from about $\frac{1}{2}$ to about 3 lb./in. on a vertical pull test. Preferably, the loopy fabric or, alternatively the velvet type fastener, is permanently attached to the face of the carpet underlayment, such as standard felted hair padding or foam such as polyurethane foam. The polyurethane foam used preferably has a density from about between about 1.5 to about 10.0 lbs/ft.³. The projections from the velvet type fastener, such as those marketed under the tradename "Velcro" ®, can be shaped like hooks, broken coils, broken loops, or, preferably, mushrooms. The combination of mushroom shaped projections attached to loopy fabric on the face of a polyurethane foam underlayment is preferred. The carpet yarn can be permanently attached to the primary backing by any means, such as by tufting, gluing, fusion bonding, ultrasonic welding or even weaving. The velvet type fastener, or alternatively, the loopy fabric, can

be glued to the underside of the primary backing, and unless bonded or welded, preferably with a synthetic rubber latex customarily used on carpet backing.

A unique feature of this invention is that the carpet module can be manufactured by attaching the facing of the carpet yarn to the backing at the same time that the velvet type fastener or loopy fabric is attached to the underside of the backing by ultrasonically welding simultaneously. Fusion techniques could also be developed for simultaneous attachment.

Another unique cost-saving feature of this invention is the use of the velvet type fastener as the primary backing in a fusion bonded or ultrasonic welding operation. The primary backing would be completely eliminated and the facing of carpet yarn would be attached directly to the fastener material by fusion or ultrasonic welding. In this embodiment, the entire velvet type fastener could be melt fusible plastic, either film with projections or woven (or knit) synthetic fiber with projections.

The staple fiber specially needle-punched into loopy fabric of this invention is preferably from about 1 to about 6 inches long. The resulting loopy fabric from the special needle punching operation preferably has from about 30 percent to 100 percent of the staple fiber anchored at each end into the fabric to form loops.

A typical loopy fabric would be specially produced by needle punching nylon staple of random 1 to 3 inch lengths into woven polypropylene, punched to depths of about $\frac{1}{4}$ to $\frac{1}{2}$ inch, resulting in a random loopy fabric of about $1\frac{1}{2}$ to 2 ounces per square yard. Up to 6 ounces or even more per square yard could be used but higher weights would be unnecessary.

The method of installing the carpet module of this invention comprises installing a loopy fabric to cover the entire area to be carpeted and then laying down carpet modules adjacent to one another over the installed loopy fabric to cover the entire area to be carpeted. The carpet module would have on the underside, adjacent to the loopy fabric, a velvet-type fastener covering the entire underside. The loopy fabric would be a fabric having staple fibers specially needle-punched into the fabric so that most of the fibers form a loop anchored at each end on the face of the fabric. It is preferred to have the velvet-type fastener secured to the underside of the carpet and the loopy fabric secured to the area to be carpeted, but alternatively the loopy fabric can be on the carpet and the velvet-type fasteners on the area to be carpeted. The fasteners are releasably attached to loops to prevent both parallel and lateral motion of the facing relative to the loopy fabric and substantial force is needed to separate the

facing from the fabric. Preferably, the carpet module has the velvet-type fastener permanently attached to the underside of the primary backing of the carpet module. Also, in this method, it is preferred that the loopy fabric be permanently attached to the face of the carpet underlay.

Alternatively, the module can be installed by glue-down of tiles made of facing, primary backing with velvet type fastener on the underside already releasably attached to loopy fabric on the face of an underlay such as foam.

Another unique feature of this invention is the method of installing carpet modules directly over previously installed worn or partially worn carpet. This method of installing carpet modules comprises laying down the facing of carpet yarn with the facing permanently attached to the face of a backing and the backing having a velvet type fastener permanently attached to the underside thereof. The fastener has projections which may be releasably attached to any fabric having a loopy fiber surface, such as a level loop carpet. This carpet facing having a velvet type fastener is laid on a previously installed carpet surface with a level loopy fiber face. Thus, by this method a new carpet facing may be installed on previously installed carpet which has been in use.

Thus, it can be seen that by use of the special loopy fabric in combination with velvet type fastener material across the entire underside of the facing or primary backing of the carpet module, we have a unique carpet module system. The loopy fabric is a needle-punched fabric specially prepared for this use. The material needle-punched is staple fiber, (not yarn) into a fabric such as a woven polypropylene or other natural or synthetic fabric, commonly used for needle punching. The staple fiber to be needle-punched into the fabric can be either natural or synthetic such as nylon, polyester or polypropylene. When the velvet type fastener material is a synthetic capable of melting due to fusion or ultrasonic bonding, the carpet yarn on the facing and the velvet type fastener can be attached in a single simultaneous fusion or ultrasonic bonding operation. Even though the fusion or bonding may melt up to 75% of the projections of the velvet type fastener material, enough projections remain to make an effective and substantial releasable "lock" with the loopy fabric. This unique production method replaces a two or three step operation with a one pass operation. This unique simultaneous one pass operation also can improve cutting accuracy when the modules are cut to precise dimensions and preserves dimensional stability not available with other systems. A method of ultrasonically bonding carpet yarn to a backing is disclosed in U.S. 3,856,605.

DESCRIPTION OF THE DRAWING

The accompanying drawing shows a cross-sectional view of a preferred embodiment of the carpet module of this invention, over an underlay.

Facing of carpet yarn 1 is permanently attached by tufting, gluing, fashion bonding or ultrasonic welding to a primary backing 2 which has permanently attached thereto by means of a synthetic rubber latex 3, velvet-type fasteners 4. The velvet-type fastener 4 material has projections which may be releasably attached to loopy fabric 5 permanently attached to foam backing 6. (The fasteners 4 and the loops of loopy fabric 5 make-up a velvet-type fastening system).

WHAT WE CLAIM IS:—

1. Carpet having the underside thereof substantially covered by one surface of a velvet-type fastening system herein defined.

2. Carpet according to claim 1 in the form of a carpet module.

3. Carpet according to claim 2 in the form of a carpet tile.

4. Carpet according to claim 1, 2 or 3 in which the underside is a fabric which has a raised pile the threads of which are shaped to constitute the material-engaging means of the velvet-type fastening system.

5. Carpet according to claim 1, 2 or 3 in which the underside fabric is a loopy fabric.

6. Carpet according to claim 5 in which the loopy fabric has staple fibres attached to the fibre by anchorage of each of their respective ends in the fabric so as to form loops.

7. Carpet according to claim 6 in which the fibres having been anchored in the fabric by needle-punching.

8. Carpet according to any preceding claim which comprises a facing of carpet yarn permanently attached to a backing having permanently attached to the underside thereof the fabric which constitutes one surface of a velvet-type fastening system.

9. Carpet according to any preceding claim releasably attached to underlay whose surface is the complementary surface of the velvet-type fastening system.

10. Carpet according to claim 9, wherein the underlay comprises an underside constructed to be suitable as carpet underlay and, permanently attached to said underside, one surface of a velvet-type fastening system complementary to the other surface which substantially covers the underside of the carpet.

11. Carpet according to claim 9 or 10 wherein the underside of the carpet has a raised pile as defined in claim 4 and the face of the underlay is a loopy fabric as defined in claim 6 or 7.

12. Carpet according to claim 9 or 10, wherein the underside of the carpet is as

- defined in claim 5, 6 or 7 and the underlay has a raised pile as defined in claim 4.
13. Carpet according to claim 12 wherein the underside is a foamed plastics material.
- 5 14. Carpet according to claim 1 and substantially as herein described.
- 10 15. A method of laying carpet which comprises positioning carpet according to any of claims 9—13 and securing it in position by adhesion of the underlay to the area to be carpeted.
- 15 16. A method of laying carpet, which comprises fastening carpet having on its underside one surface of a velvet-type fastening system, to an already-positioned underlay whose upper side is the other surface of the velvet-type fastening system.
- 20 17. A method according to claim 16, in which the carpet has on its underside a raised pile as defined in claim 4, and the underlay is worn carpet whose surface is a loopy fabric.
18. A method according to claim 16, in which the carpet has on its underside a raised pile as defined in claim 4, and the face of the underlay is as defined in claim 5, 6 or 7.
- 25 19. A method according to claim 16, in which the underlay is as defined in claim 12 or 13.
- 30 20. A method according to claim 18 or 19 which includes the preliminary step of installing the underlay over the area to be carpeted.
- 35 21. A method according to any of claims 15—20 in which the carpet being laid is in the form of carpet modules laid adjacent one to the other.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

